

MONTHLY JOURNAL OF
THE MUSHROOM GROWERS'
ASSOCIATION

MGA

BULLETIN

JANUARY, 1955 • NUMBER 61

CONTENTS	Page
Editorial: "Not too Bad"	443
New Antibiotic-Psalliotin	444
THE CULTIVATED MUSHROOM—II: André Sarazin	445
J. E. Ady makes a discovery	452
Focus on Canned Mushrooms in U.S.A.	453
Wages Up	453
Are "Mushroom Weeks" Worth while? : G. W. Baker	454
The Fred. Atkins Alphabet—O	457
DOWN TO EARTH: Dr. R. L. Edwards	458
New Book	460
First Steps in Growing—12: McGregor Bulloch	462
Its an ill wind	464
MY WAY OF GROWING: C. E. Webster (African Mushrooms)	465



The **CULVERWELL** *Manure Turner*

FOR
**MUSHROOM
GROWERS**

PETROL or ELECTRIC

EXTREMELY
MOBILE

£225
Ex Works



*The
small
machine
with the
BIG
turnover*

Bruises and aerates—does not shred. CAN BE USED FOR ALL TURNINGS. 3 men handle 25/50 tons per day. Waters as it turns. Stacks up to 5 feet. By using the CULVERWELL MANURE TURNER throughout the whole composting process, the work is reduced to the minimum, time taken is shorter with improved results.

Will pass through a door 2' 10" x 5' 10" with the detachable wheels removed

E.O. CULVERWELL *Ltd.*

MALLING WORKS LEWES · SUSSEX Telephone
LEWES 637*
(5 LINES)

PROGRESS

Mushroom production has made vast strides in recent years. Progress is indicated too by the two illustrations shown. And this progress has undoubtedly resulted from the fact that Francis Nicholls Ltd. have always given a service of outstanding ability.



Our premises in Moat Lane 25 years ago.



Our present buildings.

FRANCIS NICHOLLS
LIMITED
Smithfield Market
BIRMINGHAM

Associated Companies in all the densely populated areas.



"YOU CAN'T KEEP A GOOD SPAWN DOWN"

PINKERTON'S PROLIFIC

PURE CULTURE SPAWN

To **ALL MUSHROOM GROWERS**



HORSE MANURE

v.

SYNTHETICS

Why think of Synthetics when we can supply every Mushroom Grower in England with every ton of Horse Manure he requires all the year round

- ★ When any Grower can buy Synthetics at a low price there will be no profit left in Mushroom Growing

REMEMBER ! DIAMONDS ARE A HIGH PRICE BECAUSE THEY ARE RARE

- ★ Buy from the only organised firm of its kind in the country

D. C. BUSHELL & CO. (EASTERN) LTD.

Sandhurst Corn & Grist Mills, Camberley, Surrey

Telephone: YATELEY 2241

● *Try this new Technique
for the control of*
PHORID FLY . . .

The use of Murphy Malathion '50' as a wet spray on the structure of empty houses, at 3 to 4 fluid ozs. per gallon, is in growing popularity for the control of Phorid Fly. This treatment is effective for a period of from 10 to 20 days. Try this new technique.

Price : 1 gallon, £6. 2. 6.

● **MURPHY
MALATHION '50'**

THE MURPHY CHEMICAL COMPANY LTD.
WHEATHAMPSTEAD

HERTFORDSHIRE



You are Invited

TO—

● TO SEND YOUR
MARKETABLE PRODUCE

J. C. LUCAS & SONS LTD.

Fruit & Flower Salesmen

CASTLEFOLDS MARKET, SHEFFIELD

● **For the Best Prices
and a Straight Deal**

**OUR SPECIALITIES ARE MUSHROOMS
HOUSE GROWN EARLY VEGETABLES, SOFT & SPECIAL FRUITS
AND FLOWERS**

ESTABLISHED 1888

Telephone 22618 • Flowers 25990

PERSONAL ATTENTION TO ALL SALES

Attention all Mushroom Growers !!!

**INCREASED CROPS
at DECREASED COST
HOW ?**

Simply by using—
**LANGSTAFF'S FRESH LONG WHEAT STRAW
STABLE MANURE**

for your next compost

Our Prices are the lowest in the Trade
Delivered by Road or Rail anywhere

**ARTHUR LANGSTAFF OF LEEDS
121 GELDERD ROAD, LEEDS, YORKS.**

TELEPHONE LEEDS 25297

Orders or enquiries given immediate attention

● **COMPOST FOR
MUSHROOMS**

WHEAT STRAW when treated
with ADCO "M" will readily
provide a substitute for horse
manure for growing mushrooms

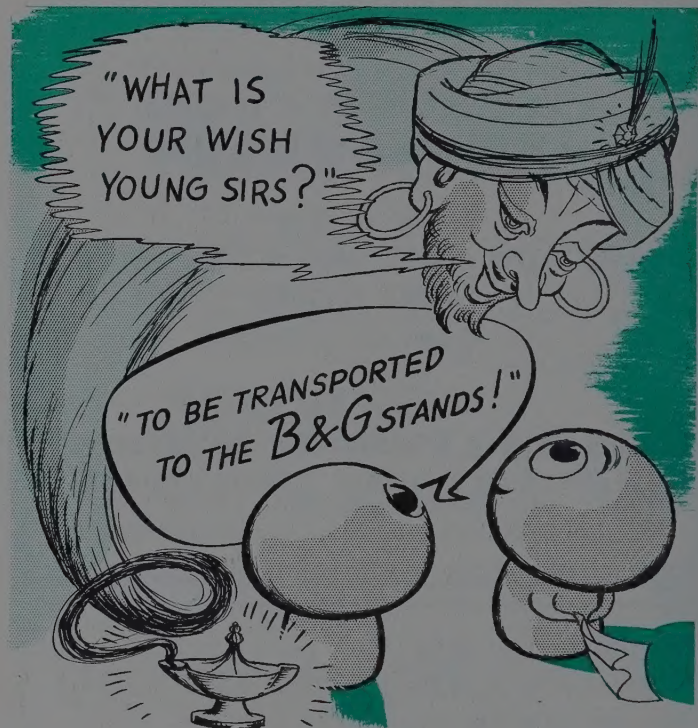
ADCO "M"

IMPROVES MANURE SUPPLIES

● **LONG STRAW MANURE**

Manure for mushroom culture such as that
from racing stables is frequently in too
long and dry a condition. This can be
considerably improved by using ADCO "M"
with better crops as a result.

Particulars & Prices from **ADCO LTD.** HARPENDEN, HERTS



*All the Best mushrooms
go to the LARGEST DISTRIBUTORS
IN THE UNITED KINGDOM —*

BROOME & GREEN (London) LTD.

COVENT GARDEN MARKET, LONDON

BROOME & GREEN (Glasgow) LTD.

CANDLERIGGS MARKET, GLASGOW

SOMERS & GIBSON LTD.

MANCHESTER & BLACKBURN



Executive Committee :

CAPT. G. P. LAWRENCE
(Chairman)
G. W. BAKER ESQ.
(Vice-Chairman)
MESSRS. G. V. ALLEN
FRED. C. ATKINS
F. BLEAZARD
H. G. BOXALL

Editorial Board :

FRED. C. ATKINS
STANLEY MIDDLEBROOK
W. A. B. HARDING
DR. R. L. EDWARDS

Executive Committee :

MESSRS. N. R. COOPER
F. L. FILMER
E. A. GOOK
W. A. B. HARDING
A. CAMPBELL MELVILLE
G. V. REED
J. STEWART-WOOD
RAYMOND THOMPSON

Editor & Secretary : WINSTON ALDERTON

EDITORIAL

"NOT TOO BAD"

With 1955 and beyond stretching ahead it is perhaps pardonable if, at this time of the year, we look, not only forward, but, for a brief spell, backwards, providing always of course, that we do not emulate some of our politicians in that, not only do we look back but we seek to dwell in the past, to the detriment of the present and the future.

1954 was, for the MGA, a somewhat important year, a year in which a considerable amount was achieved but much remained to be done. But by and large, the mushroom industry as a whole has weathered a most difficult growing year without major disaster and can look forward with confidence fortified in the knowledge that, in spite of decreased yields which have been experienced by some of the long established and mature growers, no irreparable damage has been caused. Indeed, so much enquiry has been directed at this unexpected and unexplained drop in yield for no apparent cause, that much good may well eventually result. Perhaps "not too bad" is the description of 1954, although many will doubtless add "and not too good either!"

So much for 1954, but what of 1955? Two matters which, in 1954, were prodded slowly into the open and which are bound to come right to the fore in 1955, are marketing, including packaging, and the de-rating of agricultural land, widely apart perhaps but each likely to have an influence on net returns.

It is true that growers, by and large, do not yet take sufficient care over the packing of their produce. Whilst it may be convenient to blame British Railways or whatever other form of transport is involved, it is not necessarily true and, indeed, is often quite untrue. True it is though that growers in many other branches of horticulture take far more care over packing their produce than ever mushroom growers do, delicate and susceptible to travel though the latter may be. Pre-packing for market may, in the end, prove the answer; for whatever hasty judgments may have been delivered on market pre-packs over the past few months the demand by the general public for a direct farm to shop market pack, is steadily increasing and is certain to increase at a much faster rate in 1955. Whatever the wails about increased costs this

problem is one which must be faced and must be overcome for mushrooms need this added protection far more than most other horticultural products.

Secondly, whilst the increase in agricultural wages affects mushroom farmers as it does others, and is something which is unavoidable, the proposals which are being flung far and wide for re-rating agricultural land is a threatened addition to costs which, by collective action in conjunction with the NFU, may yet be thrown down. Whilst a proposal to tax the raw material may be described as completely unfair and unjust, that is no safeguard against such a proposal being put to effect. This proposal, child of local government devoid of intelligence, is being pushed along by rating authorities anxious as ever to have more money to spend at no extra cost to themselves. This is an age where unified clamour achieves its end, whether the end be just or unjust. It is up to the NFU, supported up to the hilt by every other farming organisation in this country, to resist, tooth and nail, this further planned raid on the agricultural finances of this country. The MGA, as always making up in vigour for what it lacks in stature, should give its unstinted support to the NFU without delay.

WRA.

NEW ANTIBIOTIC – PSALLIOTIN

An anti-germ chemical, or antibiotic, can be gotten from mushrooms if extraction and purification is done under a yellow light in a dark room.

This secret to success in getting the mushroom antibiotic is announced by Nancy Atkinson, bacteriologist at the University of Adelaide, South Australia, in *Nature* (25th September).

She had discovered the antibiotic chemical in an edible mushroom back in 1946. However, it was so unstable that she was "defeated" in attempts to concentrate and purify it and, when the mushroom supply ran out, she temporarily abandoned the work.

This year, she reports, there was a good supply around Adelaide of the particular mushroom, *Psalliota xanthoderma*. So she started work again on purifying the antibiotic, using paper chromatography of water extracts of mushroom stems. The amount of activity on the paper, she found, depended on the extent of exposure to daylight during the work.

After experimenting with various light sources, she found that a Philips yellow dark room globe was most satisfactory. Work testing the antibiotic against various disease germs to determine its potential future usefulness as a remedy is now going forward.

The new antibiotic, Miss Atkinson thinks, can now "justifiably and conveniently" be named psalliotin.

Science News Letter, 30th October, 1954.

THE CULTIVATED MUSHROOM

11—CYTOLOGY (*continued*)

By ANDRÉ SARAZIN

Carpophores

The number of nuclei in the cells of the mycelium is usually rather high and that in the plectenchyma hyphae constituting the carpophore scarcely lower. In spite of their relatively larger size, they are difficult to count as they occur in one or more clumps in the depth of the cell (fig. 52). They have a fairly visible membrane, one or two nucleoli and a dense chromatin network which is sometimes affixed to the membrane. Our attention has naturally centred on the growing zone. The cells of this zone are short, in rows of 4 or 5 and their nuclear count is reduced to only from 2 to 5. These, in a young and actively growing carpophore, appear to be in a constant state of division. They are relatively larger (fig. 53). The divisions appear to take place within the nuclear membrane and the nucleolus survives until the end of mitosis (fig. 54). The minuteness of these nuclei and their occurrence in clumps precludes a clear appreciation of the different stages of mitosis.

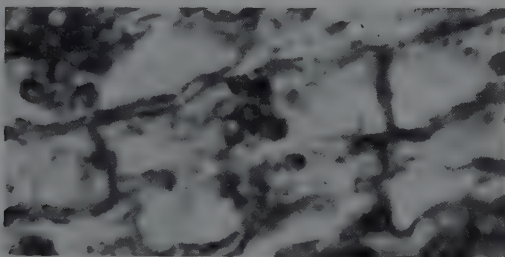


Fig. 52. Photomicrograph x 2,100. Cell from the base of a carpophore stalk showing the nuclei in grape-like clusters. Note presence of synapses on the cross walls.

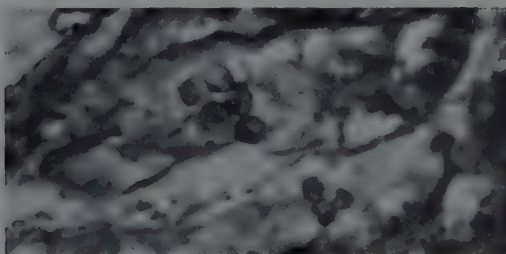


Fig. 53. Photomicrograph x 2,100. Cells of the growing zone. Nuclei in process of division and enlarged. Note for comparison three nuclei which are of normal size in the lower part of the illustration.

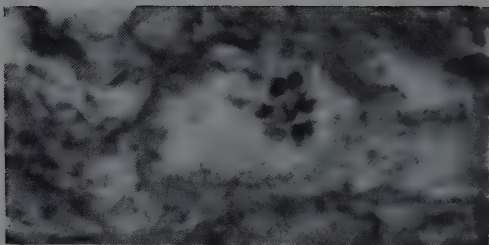


Fig. 54. Photomicrograph x 2,100. Cell of the growing zone. Nuclei showing the mitotic figures.

Starting from the growing zone and passing either towards the base of the stalk or towards the outer margin of the cap, it may be seen that there is an increase in the number of nuclei per cell despite the difficulty presented in thin sections by the interweaving of the hyphae of the plectenchyma.

Apart from its reproductive function the hymenium has been the subject of much study. The gills are the seat of a curious type of nuclear reduction. The cells of the medullary zone (trama) of the gill contain only a reduced number of nuclei, viz. 4—6. The nuclear number is even but one cannot be absolutely certain of this as the observations were made on thin sections which always entail the possibility that more or less of the cell may have been cut away. In the short cells of the sub-hymenium there are only 2—4 nuclei. This number becomes reduced to 2 in the hymenium.

My own investigations confirm those of Kligman (who nevertheless did not pay particular attention to the growing zone), viz., that there is a constant and progressive reduction in the number of nuclei per cell from the base of the stalk upwards ending in only 2 in the basidium. Moreover they confirm, as do the various cytological studies already cited, Hein's observations that the development of the carpophore is dependent on the growing zone and that the number of nuclei per cell increases from this region towards the more fully developed base of the stalks and towards the periphery of the cap. These conclusions invalidate those of Hirmer (1920).

In the young carpophore, the hymenium is undifferentiated and made up of a palisade of hyphal tips. Later a cross-wall cuts off a cell at each tip (*c.f.*, *MGA Bull.* 30, p. 165). These cells are binucleate, and in the course of the maturation of the carpophore other hyphal tips (which by their bulk add to the thickness of the gill) would appear to insinuate themselves between these primordial tips. When the carpophore reaches maturity, *i.e.*, when the veil tends to rupture, the hymenium enters an active phase.

The basidia evolve rapidly and more or less in succession. After increasing slightly in size, the basidium becomes the seat of important

nuclear phenomena. The two nuclei which had hitherto remained inactive fuse together (fig. 55—2). Immediately following on this the resulting nucleus increases to three times its initial volume and presents the different phases of a heterotypic division (fig. 55—3). The heterotypic prophase then ensues. It has been possible for me to record quite clearly the principal stages which characterize this prophase and they appear to be analogous with those of higher plants.

At first, threads which stain deeply in haematoxylin fill the nuclear vacuole (fig. 55—4); then a clumping together or synesis results in the concentration of all these threads at one of the poles of the nucleus (fig. 55—5). Shortly afterwards, in the pachytene stage this clump becomes disentangled and the re-constituted threads appear doubled, at least for part of their length (fig. 55—6) filling up the nuclear vacuole; this is the zygotene stage. These same threads which become shortened during the strepsitene stage (fig. 55—7) initiate the pairs during diakinesis (fig. 55—8, 9, 10, 11); in fact appear as 4 short U-shaped pairs. It is at this stage that a nucleolus appears inside the nuclear membrane.

Fig. 55.



At the end of the prophase 4 pairs of chromosomes are seen massed at a point equidistant from the two centrosomes which are connected by a delicate poorly staining spindle; the nuclear membrane has completely disappeared (fig. 55—12, 13). During the anaphase two groups of 4 chromosomes may be detected in process of migration towards the two centrosomes which form the poles (fig. 55—13). At the telophase these chromosomes are seen as two clumps centred around their respective centrosome and connected by a fine thread which represents the remains of the spindle (fig. 55—15). Sometimes the nucleolus survives as far as and into this phase but usually it becomes progressively smaller and is absent in the anaphase.

Finally, the spindle disappears and the two daughter nuclei become reconstituted (fig. 55—17) and a nucleolus is seen affixed to the nuclear membrane. These two nuclei do not remain inactive for long; they undergo a further division which is homeotypic. The surviving centrosome divides into 2 daughter centrosomes (fig. 55—18, 19) which migrate to diametrically opposite poles and homeotypic division ensues.

After a short prophase which is characterised by the invasion of the nuclear vacuole by very thick chromatin threads (fig. 55—20) 4 short rods become visible at the metaphase and take up positions along the axis of the faintly staining spindle which is stretched between the two centrosomes (fig. 55—21, 22). At the anaphase 8 chromosomes which appear to result from the halving of the four preceding rods migrate towards their respective poles (fig. 55—22). It is then possible to observe in the basidium in the telophase four chromatic clumps connected in pairs by a delicate spindle (fig. 55—23) and then the formation of 4 daughter nuclei each with a clearly visible surviving centrosome (fig. 55—24). The two basidiospores are then developed, first as delicate vesicles; and enlarge rapidly.

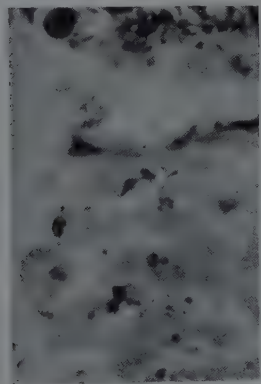
At the time that this occurs each nucleus is situated behind its centrosome (fig. 55—25); the two upper nuclei migrate first towards the spores each dragged after its centrosome and in their passage towards the spores become stretched in the narrow canal of the sterigma (fig. 55—26, 27). Then the last two nuclei remaining in the basidium become active and each migrates into a basidiospore after undergoing the same modification in shape as their predecessors (fig. 55—28); but then their paths have crossed so that ultimately two nuclei of different origin come to lie in each basidiospore (fig. 55—29). The basidiospore is thus binucleate. In it a final nuclear division occurs, one which is observable only with difficulty since the spore wall increases rapidly in thickness.

This mitosis occurs simultaneously in both nuclei so that the ultimate number of nuclei in the mature basidiospore is 4 (fig. 55—30, 31, 32). It is these 4 nuclei (fig. 56) which were observed in the germ-tube when the basidiospore germinated. Very rarely does another division supervene bringing the number of nuclei to 8 (fig. 55—33), (Colson, 1935).

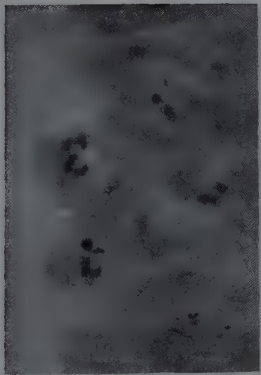
Some basidiospores have been observed with single nuclei in process of division so that the final number of nuclei in the mature



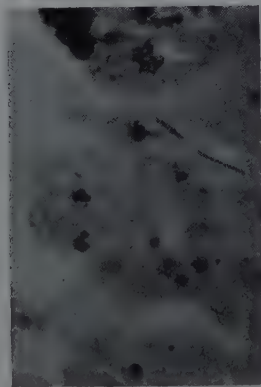
Basidia: anaphase in meiosis.



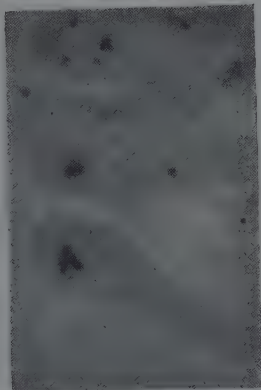
Basidium: end of anaphase in meiosis.



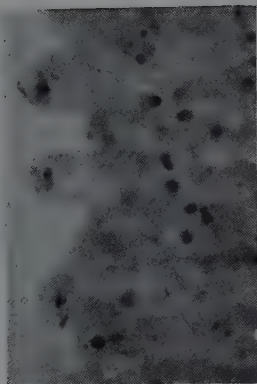
The prophase in meiosis.



Basidium: beginning of homeotypic division, two nuclei in prophase.

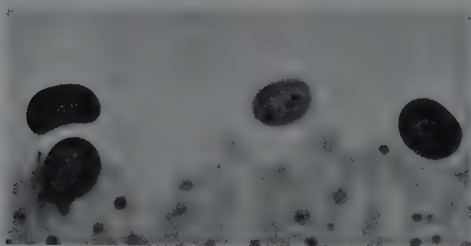


Basidium: equatorial plate in meiosis.



Basidia: the metaphase in meiosis. Chromosomes on the spindle massed together at a point equidistant from the two centrosomes.

Fig. 56. Photomicrograph x 2,100. Four nuclei in mature basidiospore.



spore was 2 (fig. 55—35, 36, 37). The question arises as to whether these basidiospores were in communication with 4-spored basidia or whether they arose from 2-spored basidia in which the last 2 nuclei were blocked during their migration (fig. 55—34) (*c.f.*, *MGA Bull.* 31, p. 204). It is impossible to be certain on this point. Similarly, some (Maire, 1902) concede that a supplementary division involves 2 of the nuclei resulting from the homeotypic division thus bringing the number of nuclei up to 6 in a 3-spored basidium; three groups of 2 nuclei pass respectively into each of the three basidiospores. This interpretation is also too tenuous to be advocated.

According to Kligman's view concerning these three-spored basidia, of the 4 nuclei formed normally, 2 pass into one of the basidiospores and only 1 into each of the others; if this interpretation is correct perhaps it might explain the percentage of spores which fail to germinate since those with only 1 nucleus are abnormal.

Finally, my mitotic figures which are especially clear, have enabled me to attribute to the strains of *Agaricus campestris* under cultivation in France, a haploid number of chromosomes, either, $n=4$ or $2n=8$. Their number approximates to those commonly observed for basidiomycetes (Wakayama 1932, Kuhner 1938, Salmon 1937).

Although my investigations confirm and complete the results obtained by Colson (1935) and Kligman (1943) I do not agree with their statement that the haploid number of chromosomes is: $n=9$ or $2n=18$. Colson in her conclusions stated that there was no evidence either for or against the role of the centrosome in the formation of the sterigma and in the traction of the nuclei into the spore.

By means of delicately differentiated staining controlled by special nuclear stains such as the Feulgen nuclear reaction I have obtained results which make it possible for me to assert that in the 2-spored cultivated mushroom the centrosomes are still adherent to the nuclear membrane. When the nuclei migrate they become stretched and the centrosomes trails after it in a kind of net the chromatin material which is fragmented into granules and also the nucleolus (fig. 57, 58), and the whole mass moves towards the spore.

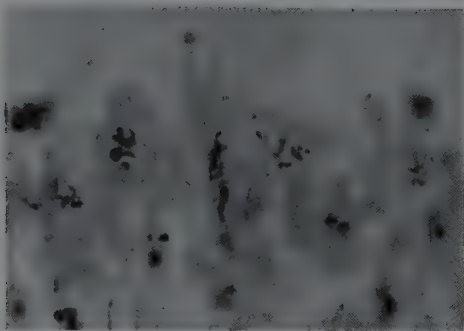


Fig. 57. Photomicrograph x 2,100. The first two nuclei migrate towards the two basidiospores. The centrosome draws after it as though in a net the fragmented chromatin material and the nucleolus. Note prophase figures here and there in the basidia.

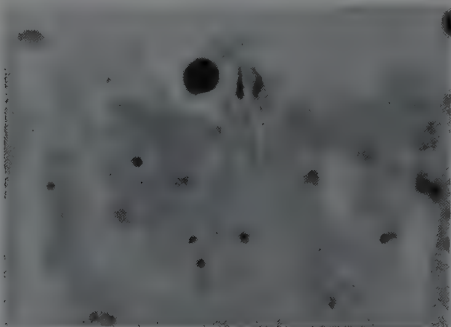


Fig. 58. Photomicrograph x 2,100. The nuclei become stretched in order to pass through the sterigma.

These observations confirm the dynamic role of the centrosome during the migration of nuclei. This nuclear investigation should be very useful in interpreting the evolutionary cycle of the cultivated mushroom and so, finally, to conclude, here is a brief summary of the characteristic features exhibited by the nuclear evolution of the cultivated mushroom:

Two pairs of nuclei pass into the germ-tube when the spore germinates. The mycelium is multinucleate; the nuclei exhibit a complete independence. The basidium is the seat of a nuclear fusion followed by a heterotypic division; a homeotypic division brings the number of nuclei in the basidium up to 4. Each of the basidiospores receives a pair of nuclei of separate origin and in the mature basidiospore as a result of simultaneous division the nuclear number becomes usually 4. The haploid chromosome number is: $n=4$ (Sarazin 1939), $n=9$ according to others (Colson, Kligman).

References

- COLSON, V.—The Cytology of the mushroom *Psalliota campestris* Quel. Ann. Bot. 49, No. CXCI, January, 1935.
- HIRMER, M.—Zur Kenntniss der Vielkernigkeit der Autobasidiomycetes Zeitschr. f. Bot., 12, 657-674, 1920.
- KLIGMAN, ALBERT M.—Some cultural and genetic problems in the cultivation of the Mushroom *Agaricus campestris* Fr. Amer. Journal of Botany—Vol. 30, No. 10, 745—763, 1943.
- KUHNER, R.—Le genre *Mycena* Fries. Encycl. Mycol. 10—Le Chevallier, Paris, 1938.
- MAIRE, R.—Recherches cytologiques et taxonomiques sur les basidiomycètes. Thèse, Paris: 1—209, 1902.
- SALMON, J.—Étude cytologique laticifère des lactariorussulés et quelques observations sur les mitoses des basides. Rev. Cytologie et Cytophysiologie végétales. Tome II, Fasc. 4: 376—391, 1937.
- SARAZIN, A.—Evolution nucléaire de la baside et des basidiospores dans *Agaricus campestris* var. cultivée. C. R. Acad. Sc. Tome. 206: 275—278, 1938.
- WAKAYAMA—Contributions of the cytology of Fungi. IV, Chromosome number in the Autobasidiomycetes. Cytologia III, 261—284, 1932.
- The photomicrographs are the property of the Author. The translation is by Dr. C. J. La Touche.
-

FLIES AND OTHER PESTS

J. E. ADY makes a discovery

“The right equipment is all important” says J. E. Ady.

It appears to be generally accepted that “Malathion,” “Malasol” and similar atomising concentrates, when thoroughly applied, are the most effective agents in eradicating the fearsome fly and other stubborn pests. The phrase worth noting is “when thoroughly applied.”

Where some growers find that these concentrates have little effect, it is generally found that the atomisers used were “almost all” that could be desired. But when the difference between profit and loss is at stake, “good enough” is, in facts not good enough.

Experts claim that good atomisation and uniform spread is not certain at under 30 lb. pressure per square inch, and if sprayed insecticide is to be effective good atomisation will achieve this as the spray will reach all parts of the shed.

There are scores of low pressure atomising cylinders and pumps in use. Are they good enough? Using them may be a waste of good money.

A few growers have small compressor units on trolleys. These, no doubt, do the job efficiently, though heavy, bulky and highly priced, and consequently unattractive and unwieldy for use by the average grower.

These factors bring out the need for a really portable high pressure compressor that can be carried easily whilst in use and give the required pressure and atomisation at reasonable cost.

After much investigation, the writer found that such an article is available. It is a small portable spraying compressor fitted with a pressure gauge which works at 30—35 lb. pressure and weighs only 20 lb. The writer will be very pleased to give the name and other particulars to members who are interested.

CANNED MUSHROOMS ATTRACTING CONSIDERABLE ATTENTION IN AMERICA

The "New York Journal of Commerce" (18th October, 1954), says:—"Industry leaders in the canned and fresh mushroom trades are reported as preparing their organisations for an active season. This is a two crop per year yield starting in the fall and winter and during the early spring.

Pennsylvania production now ranks at about 70 per cent. of the total of the country, according to these interests. New pack canned offerings are now coming on the market in various sizes and are said to be attracting considerable attention."

WAGES UP

A wage rise of 7/- in the minimum rate for men, bringing the rate to £6 7s. for a 47 hour week, with a proportionate increase for women (new rate £4 16s. a week) and juveniles has been agreed by a majority vote of the Agricultural Wages Board, the National Union of Agricultural Workers' members of that committee being supported by the independent members whilst the NFU members, representing the employers, voted against the proposal. The latter pointed out that conditions in the industry had not changed since the N.U.A.W. claim for £1 a week increase was turned down in June.

The Board is due to meet on 5th January to hear objections and the new rates, if agreed, are likely to come into force during this month.

the world's finest mushroom basket

Designed after consultations with growers, wholesalers and retailers, the Dring Mushroom basket embodies lightness, ease of stacking, rigidity and, above all, the wax impregnated board from which they are made *absolutely eliminates the possibility of the mushrooms being spoiled through the basket absorbing moisture.*



DON'T DELAY ORDER NOW!

DRING

at the lowest cost of
any basket in use today

Dringport Works, The Airport, Portsmouth, Hants.

ARE "MUSHROOM WEEKS" WORTH WHILE?

asks G. W. BAKER, MGA Vice-Chairman

No doubt this is a question which has cropped up in the minds of many in our Industry and the following conclusions have been drawn from experience gained at Tunbridge Wells.

First and foremost it is essential to have the whole hearted backing of the retailers in the district and this we certainly had at Tunbridge Wells.

Secondly, the growers must be prepared to guarantee the supply and this may mean a sacrifice on their part if it happens to clash with a short market, which did happen during the Tunbridge Wells Week (a heavy flush week would be to their advantage).

Thirdly, someone in the centre of the district must undertake to receive and distribute the supplies to the retailers with as little delay as possible. On such a week and with good publicity, one cannot begin to estimate the requirements of the retailers many hours ahead and it means moving heaven and earth to meet the demand as we also experienced at Tunbridge Wells.

Providing the three sections mentioned above all play their part, "Mushroom Weeks" are one of our finest forms of publicity for mushrooms and can easily increase sales tenfold which was the case at Tunbridge Wells. It can be arranged at very little cost and has the material effect of getting mushrooms into the homes, which after all is better than recipes. (Recipes certainly play a useful part.)

Many growers in areas where "Mushroom Weeks" are not possible and who have to use the markets, will probably query any benefit they derive from such "weeks," but surely if the demand is increased in various centres, the wholesalers and the growers will benefit as the price of mushrooms will keep firm in the market.

Even if "Mushroom Weeks" tend to attract direct sales to the retailers this benefits all growers for it relieves the market of a certain supply and hence increases the demand which keeps a firm price. It also does ensure the housewife in the towns which have direct supplies getting really fresh mushrooms which have not been ruined through transport handling.

The Executive Committee will do well to go fully into this matter from all angles and any member's views would be welcome.

The appeal sent to 37 growers in an area surrounding Tunbridge Wells to supply Cups and Opens at 3/- per lb. nett on the understanding that these were retailed at 4/- per lb. for the "Special Show Week," was more than disappointing, in fact only five growers replied.

Had it not been for a few loyal members and some from out of the area, who so nobly diverted part of their market consignments by telephone from the Assembly Hall, to help keep the supplies going, the "Week" would have been a flop. As it was, the demand exceeded the supply by over 1,000 lb.

THE PROOF OF THE SPAWN IS IN THE CROPPING!

GROWERS REPORT :—

BUCKS. : From R. H. Fryer, Esq., Nashleigh Mushroom Farm, Chesham. 6th November, 1954.

" you may be interested to learn that in a current crop on shelves we have just produced 2 lb. per sq. ft. in 3 weeks 4 days. The third flush is still producing and it seems likely that by the end of this flush the crop will have achieved 2½ lb. in a day or two over four weeks."

HERTS. : From John C. F. Cox, Esq., Harpenden, Herts. 8th November, 1954.

" our last five crops have averaged 2.75 lb. per sq. ft. in 13 weeks cropping!"

NORFOLK : From H. McP. Page, Esq., Norwich. 23rd October, 1954.

" 1,190 lb. of mushrooms on 351 sq. ft. of bed is almost 3½ lb. per square foot This proves to me that your spawn is literally 100% and second to none."

STAFFS. : From M. Mason, Esq., Springhill, Lichfield. 25th October, 1954.

" P.S. You may be interested to know that I have had a crop of 2½ lb. per sq. ft. at my first attempt with your spawn."

SUSSEX : From F. Knight, Esq., Langney, Eastbourne. 22nd May, 1954.

" During the last twenty-one years I have been a regular user of your manure spawn I have always had better crops than was the case with other brands.

"All spawns look much the same in the advertisements but yours wins in the sheds!"

DARLINGTONS

Regd

PURE CULTURE **100%** PRODUCTIVE
MUSHROOM SPAWN

W. DARLINGTON & SONS LTD.

WORTHING

EST. 1860

SUSSEX

The main outcome of this "Week" is the fact that the increased demand has persisted up to the time of going to press. Although the retailers' prices are at normal levels, it is three times the average sold before the "Week."

Our thanks first of all to Mrs. Turner and Mr. Francis, who undertook the collection and delivery to the retailers.

Then to the following growers and wholesalers who nobly endeavoured to keep the supply going:—

G. V. Allen, Bilting Nurseries	..	..	..	274 lb.
Broadham Produce Co. Ltd., Oxted	..	..	..	566 lb.
E. A. Gook, Boundgate, nr. Faversham	..	..	..	20 lb.
Harding Bros., Tenterden	..	..	..	180 lb.
Clifford King, Woking	..	..	..	50 lb.
A. G. Lindfield Ltd., Thakeham	..	..	..	100 lb.
Poult House Gardens, Tonbridge	..	..	..	104 lb.
G. C. Smith (Loddington Farms Ltd.), Linton	..	..	..	110 lb.
E. M. Sparkes (Abbey Nurseries Ltd.), Lancing	..	..	..	176 lb.
T. J. Poupart Ltd., Covent Garden Market	..	..	..	700 lb.

PUBLICITY

THEY ARE DOING THEIR SHARE—ARE YOU?

The Publicity Sub-Committee of the MGA offer their grateful thanks to the following contributors to the Publicity Fund:—

Messrs. Francis Nicholls Ltd., Birmingham
 Messrs. R. E. Jenkinson Ltd., Covent Garden
 Messrs. Geo. Monro Ltd., Covent Garden
 Messrs. T. J. Poupart Ltd., Covent Garden
 Messrs. G. E. Leatherland Ltd., Newcastle-on-Tyne
 Messrs. Stable Manures Ltd., Lancing, Newmarket
 Messrs. The Eclipse Peat Co. Ltd., Ashcott, Som.
 Messrs. H. Goodall Ltd., Wolverhampton
 Messrs. A. Williamson (19) Ltd., Birmingham
 Messrs. W. D. Richards Ltd., Birmingham
 Messrs. J. H. Wilson Ltd., Leeds

THE FRED. ATKINS ALPHABET-0

Oedocephalum. A species of *Oedocapham* (*fimetarium*?) has been found on mushroom compost and on casing soil. I am told that one species is an imperfect form of *Peziza pustulata*. Darlington's News states that the fruiting bodies of *Oedocephalum fimetarium* are Fairy Cups, and that Fairy Cups are the fruiting bodies of *Perziza vesiculosa*. What concerns us really is that a little *Oedocephalum* may mat the soil but doesn't appear to do much damage to the crop.

Oil. Minerals oils or the fumes from oil heaters are a common cause of Rose Comb malformation.

Oldacre House. In the early 19th Century a Mr. Oldacre introduced to Britain from Germany (or was it Russia) what was probably our first specially-designed mushroom house.

Olive Green Mould. The tiny olive-green fruiting bodies of *Chaetomium olivaceum* are an indication that the compost has been peak-heated to a temperature in excess of 145° F. Its presence, or the reason for its presence, can substantially reduce the crop.

Oniscus asellus. A species of "pill-bugs" (woodlice) which has been recorded as injurious to mushrooms, chewing holes in the caps. Use DDT.

Oospora. See White Plaster Mould.

Open Veil. According to Sarazin, "open veil" or "gill-less mushrooms," or "ouverts de nature," can be caused by anything which checks the growth of the cultivated mushroom. Sinden tells me "it is a physiological response to certain conditions of the compost, and varieties (of spawn) vary much in their susceptibility to the conditions."

Oxygen. The beneficial bacteria require oxygen for their breaking-down labours in the compost. That is why pasteurization fails if all the oxygen is exhausted before the house is opened up. Some growers open up for 15 minutes twice a day, others leave one or two ventilators "cracked open" throughout the peak heat. Replenishment of oxygen is important during cropping also; and the only moment when we think it can be ignored is during the spawn run—but we're not certain about that.

Ozone. The Knaust Brothers have patented the passing into a house during pasteurization of a stream of air containing 1-4 p.p.m. of ozone.

OUR ADVERTISERS

Any money to spend? Then spend it with our advertisers who, through this publication, lend steady support to the Association.

DOWN TO EARTH

By Dr. R. L. EDWARDS

Mr. Gowland and no doubt many other growers want simple and positive information on various aspects of mushroom growing. I think they rather disregard the complexities of the subject, and although it is possible to give simplified directions, these are unlikely to lead to the best results. It should be obvious that if top yields could be obtained by following simple directions, mushroom growing would be made much more easy and less profitable.

That being said, and I hope understood, I will try to give some of the simple answers demanded. At the same time it is necessary to mention their limitations.

Safe Preservative for Trays

The safest effective treatment is pressure treatment with Wolman's salt mixture. Trays treated in this way can be used as soon as they are quite dry.

Insecticides

For flies, until the new resistant species of phorid appeared, BHC (usually as 5% dust) gave satisfactory control. It can be used in several ways: mixed in the compost, normally at 1 lb. per ton, though up to 5 lb. may be needed if flies are particularly troublesome; dusted on the beds at filling, before casing, and during cropping; as smoke generators at all these times, as aerosols, or in continuous thermal generators. Mixing BHC in the compost is preferable when a good peak-heat may not be obtained. In addition BHC usually controls springtails and some mites. If any of these survive, TEPP kills some but not all species.

There are of course other insecticides which kill some insects, but a detailed account of them would not be simple. And there are some circumstances when no insecticide gives complete control. It is important that all these insecticides should be used in known quantities and ways approved by the suppliers. Too much can injure the crop.

Activators

Manure which is rich enough in droppings to contain 2% of nitrogen does not benefit appreciably by having more nitrogen added to it. It is, of course, not practicable to have each delivery of manure analysed, and in any case sampling a load of manure is extremely difficult, so it comes down to a decision depending on the grower's judgment.

If he thinks the manure has not enough droppings, then he should add dried blood, poultry manure, or one of the proprietary activators.

As to quantities, the manufacturers of proprietary materials generally offer suggestions; the obvious way of looking at the question is—what proportion of the normal amount of droppings is there? If half, then dried blood is worth adding, up to 84 lb. per ton of manure, and more or less according to the estimated richness of the manure. The activator must be added at the start of composting; and the use of activators is not always successful with short composting. The increase

YOU
can be
Sure of

Mount Mushroom Spawn

C. E. WARD & SON
LIMEHOUSE NURSERIES
RAYLEIGH, ESSEX

December, 1954.

Messrs. J. E. R. SIMONS Ltd.
HARLOW, ESSEX.

Dear Sirs,

*We thought you would like to know
that on 1500 ft. of shelf bed of your
Mount White Spawn, we have actually picked
1380 lbs. of first class mushrooms in 7 days.*

Yours faithfully,

P. WARD.

Be Sure—Use the Best!

Distributors: **J. E. R. SIMONS LTD., HARLOW, Essex**
TELEPHONE: POTTER STREET 65 TELEGRAMS: SIMONS, HARLOW

in yield varies with the quality of the original manure and the activator added. It may quite easily be $\frac{1}{2}$ lb. per sq. ft., and could be more in some cases. There will be no benefit at all if the original manure was itself rich enough.

Average yield on trays

Mr. Gowland's question is one commonly posed by people who are thinking of taking up mushroom growing. The rather unsatisfactory answer is that it depends how good the grower is. There is no such thing as "Correct" compost, casing soil, etc.; they may be good, bad, or indifferent, and yields vary accordingly. Good growers average about $1\frac{1}{2}$ lb. on trays, and the general average is probably about 1 lb./sq. ft.

Where can one obtain the inventions manufactured for the mushroom grower?

Several sundriesmen produce quite comprehensive catalogues to answer this question. Concerning anything in the Bulletin's "Seen this?" feature one should apply for information to the Editor, and for things seen elsewhere, to the apparent owner, or to the publisher if they are found in a book or periodical.

(Next article: Casing soil, ventilation and air circulation.)

NEW BOOK **"MODERN MUSHROOM CULTIVATION"**

By A. A. RICHARDS

A. A. Richards, nursery manager at the Cheshunt Research Station for many years, has written a new book "Modern Mushroom Cultivation" which Collingridge have published at 8/6d.

Whilst mushroom growers, commercial and amateur, take the view that any book on growing is worth reading, on the grounds that it may contain some information which may lead to increased efficiency, this particular book, as the author states himself, is designed primarily to help the amateur grower and the beginner. Whether or not commercial growers will agree that what was "something of a gamble" has now become "a reasonable certainty" is entirely another matter. Despite international research on a bigger scale than was dreamed of ten years ago, mushrooms are still "unreasonably uncertain." Mr. Richards insists however that "most of the hazards connected with mushroom cultivation have now either been eliminated or are at least controllable." Commercial growers are unlikely to accept this as fact and will query too whether peat is "at all times constant and uniform." They will query too whether it is generally accepted that any water given to the beds should be as near bed temperature as possible: that there is no doubt that the principal cause of small mushrooms is insufficient ventilation: whether the first turn of the compost is usually after 11 days.

The photographs are excellent and except for minor mistakes in the spelling of scientific names of diseases and the attributing of larvae damage to mites (in the 'horror' facing page 93), it is a remarkably well prepared work.

"Modern Mushroom Cultivation" is published by W. H. & L. Collingridge, Covent Garden, W.C.2, and costs 8/6d.

Introducing—

—SOBEXAS— 'GRAIN'

This new form of SOBEXAS SPAWN is
fully maintaining the high reputation for
quality and cropping.

Write for full details

**GEO. MONRO LTD.
WALTHAM CROSS, HERTS.**

and at

**Aylesford, Gt. Totham, Guernsey, Swanwick,
Cheltenham, Penzance, Spalding, Worthing**



FIRST

STEPS

IN

GROWING

by

McGregor Bulloch

12-PICKING, PACKING AND MARKETING

The marketing side of mushroom growing is discussed at this stage, because, if the preparatory work of growing has been done with reasonable care, a fair crop should result, and the mushrooms have to be sent away as soon as they are ready, preferably on the exact day on which they reach marketable size or condition.

The beginner must be reminded of one or two points to watch as his first crop moves from the pinhead stage to the time when the first mushrooms are ready for picking. If the growing temperature has been reduced gradually from about 70° F. to below 65° F. when the first pinheads form, it is advisable to arrive at a final steady growing temperature of between 58° F. to 60° F. when the mushrooms mature, which will be from a week to ten days after the appearance of those first pinheads.

During this period, light watering will be necessary to keep the casing moist, and although it may seem an unnecessary reminder, watering should not take place just before the mushrooms are picked. The caps will be wet and the resulting pick will be in a sorry state, since it will be impossible to brush off adhering particles of soil or peat. However, watering is usually left till the first flush has been cleared, or at any rate till after the day's pick is over, and the caps should dry by the following morning.

Mushrooms in the first flush tend to grow in vigorous clumps especially when spawn is planted in pieces rather than scattered, with anything from two or three to as many as a hundred or more in each clump, although this latter quantity is not usual. One or two mushrooms will mature more quickly than the rest, and until the grower is familiar with the look of a mushroom which is ready to pick, he must try the underside of the cap lightly with his finger to find out whether the cap is expanding so that the protective veil is about to break.

Generally speaking, the majority of mushrooms in a particular flush become ready for picking at about the same time, although there will always be a number which open early, and some which remain as closed buttons later than the rest. The best state in which to send mushrooms to the market is when the veil is soft, but still strong and intact with no gills showing. By the time they arrive in the markets the veils will be on the point of breaking and they should be in their most attractive condition, although some markets give a better price for tight buttons. Needless to say, in the hot summer months, mushrooms open very rapidly, even after they are picked, and this must be allowed for.

Mushrooms should not be cut, but broken off at the base of the stalk with a combined bending and twisting movement, the mushroom being held lightly at the sides of the cap with the thumb and fingers. The extreme end of the stalk with adhering soil or peat is cut with a sharp knife and allowed to drop into a bucket or other container, and if the stalk is long, a further section of it is trimmed off into a separate basket, while the mushroom itself is laid with the stalk upwards in the chip basket allotted to it. The grower must decide on his own picking and packing methods, which differ widely in this country. Sometimes the mushrooms are picked and placed root downwards in shallow trays, still with soil adhering, and then transferred to the picking room where they are trimmed and graded into chips, or they are trimmed in the growing houses and graded in the packing shed. Both of these methods involve double handling of the mushrooms, with a possible bruising or staining of the tissue, apart from the extra time involved. Bruises do not always show up straight away, and the beginner who would like to see what sort of condition his mushrooms are in when they arrive on the next day at the market, should leave a chip overnight in the packing shed and examine it the next morning.

If the system is worked out efficiently, there is a lot to be said for grading the mushrooms into separate chips as they are picked. All that is then necessary is for a slight adjustment to be made in the despatch room, when one or two mushrooms are added or removed to get the correct weight. Accurate balances are of course essential. The grower is also advised to conduct his own experiments in order to find out how much weight is lost by evaporation in the 12 hours or so which elapses between the mushrooms being weighed and arriving at the market. The amount varies according to the type of pack employed, but may be from 1 to 2 ozs. per 3 or 4 lb. chip, again depending on the climatic conditions.

Marketing is fairly straightforward. Agents in the principal markets, who advertise in the MGA Bulletin and elsewhere, should be contacted and they are only too willing to advise the sender as to the quantities which may be sent, the best days on which to send, and the most popular size of pack for their particular market. Chips holding 2, 2½, 3, 4 and 6 lb. of mushrooms are standard, with 3 or 4 lb. being perhaps the most popular. A mistake which is liable to occur, is when 4 lb. chips are ordered, and the grower finds that only 2½ lb. of mushrooms will go into them, the 4 lb. referring to heavier fruit such as tomatoes. A 6 lb. fruit chip will hold about 4 lb. of caps or buttons or 3 lb. of opens. When ordering chips, therefore, it is best to specify the number of pounds of mushrooms the chip should hold comfortably. The chip suppliers will also provide cardboard covers, printed with the necessary details about the contents and a rubber band slipped over each end of the chip will keep the lid down effectively, although a piece of string suitably arranged will help to deter pilferers. It will also be found convenient to tie chips in pairs, since they can be stacked for transport and handled by the railway staff more easily and without the same danger of upsetting the contents as occurs with single chips.

Most agents will provide a rubber stamp which will save a great deal of time normally spent in writing out addresses. Or the agent will supply printed labels if preferred.

Commission on sales charged by agents is either $7\frac{1}{2}\%$ or 10% , with an additional handling charge of 1d. or 2d. per chip. Some agents send a daily telegram advising the prices obtained on that morning, which enables the grower to follow the market trends before despatching the next consignment.

The beginner would be advised not to take too much notice if a particular agent gets a lower price on a certain day, but to send a fairly regular and even consignment once a good agent has been found, for it is in the latter's interests to look after his regular sender, and returns will even themselves out in the long run.

IT'S AN ILL WIND

"Tower-Bird," a popular contributor to the "Shooting Times" and a keen nature student, had something to say about mushrooms in general and cultivated mushrooms in particular, in the 12th November issue of that paper.

He wrote:—"This year I have not touched a blackberry nor would I eat a mushroom in myxomatosis country for only yesterday I saw some growing through grass where rabbit remains littered it. My mind turned to the previous evening when I had found a basketful of cultivated mushrooms outside my door, with a note from which the following is an extract. The note was from a grower of mushrooms at Wittering (Sussex) and began: 'I am most indignant at an article in "The Shooting Times" (page 690, 1st October, issue)*. I would like you to accept these mushrooms with my compliments and, having sampled the flavour, perhaps you will not agree with all that L. R. James has written!.' Well, now, a young cock pheasant was roasting in the kitchen and was joined eventually by a generous dish of cultivated mushrooms.

Let me confess however, that I myself have always preferred wild field mushrooms to cultivated ones because I believe the flavour is greater. I have always been able to pick plenty of fresh mushrooms with the dew upon them and I like to help myself freely from nature's garden. But let me also confess that these cultivated mushrooms are far and away better than I thought they would be. They were well flavoured, non-maggoty, had a great deal more 'meat' on them than most wild mushrooms, and, in these days of myxomatosis, with the corpses and remains of rabbits lying all over our lovely countryside, they have a definite advantage."

*In the previous article referred to, L. R. James had described the cultivated mushroom as "a very dull vegetable indeed". Ed.

MY WAY OF GROWING

16—By C. E. WEBSTER

of African Mushroom Industries, Hillcrest, Natal

I have been invited by our Secretary to make a small contribution to the "Bulletin," and gladly accede to his request. I fear though that as the methods we have adopted are basically orthodox, being derived from literature compiled either in the United Kingdom or the U.S.A., "My Way" may not be of much practical value to overseas growers. However, I am presuming that my article will be of some interest to most "Mushroomites," and am thus emboldened to proceed.

Since chancing upon some pamphlets about 20 years ago, issued by a certain firm whose main concern, I subsequently learned, was to dispose of imported spawn and insecticides at an exorbitant price, I have been firmly wedded to mushroom cultivation, and was not at all discouraged at not being able to produce the 3½ lb. the pamphlet proclaimed. I have naturally had my ups and downs (who hasn't with the unpredictable mushroom?) but am still as keen as ever.

Before proceeding further permit me to say that in my opinion conditions in the United Kingdom make mushroom growing there easier than in S. Africa where the summer temperature at times soars to well over 100 degrees Fahrenheit. To those who have mainly low temperatures to contend with this may seem open to question, but I have found it far easier to keep the growing shed warm in winter than cool in summer.

Our (African Mushroom Industries) shed is devoted to shelf growing; is constructed of hollow cement blocks; has a pitched asbestos roof, and asbestos ceiling with the usual louvres for ventilation. At intervals a block in the walls was omitted, the space being filled with coke, held in position by heavy copper gauze attached to either side of the walls. Along the top of the walls runs a water pipe with small holes at short intervals allowing the water to percolate down the hollows in the blocks and the coke. This method, used by some farmers for cool rooms, is mainly dependant on outside breezes and while certainly reducing the temperature some seven to ten degrees, is not quite the success we had hoped for.

The temperature here in winter is ideal, ranging between 47 and 55 degrees Fahrenheit, and we concentrate on winter crops when pests and disease are very rare. Summer growing we rather dread, although the attendant difficulties have afforded us valuable experience.

Compost is mainly confined to the racing stable product, and the practice is to supply the stable with wheat straw—costing around 5/6d. per 75 lb. bale—and to remove the compost twice weekly. This is insisted on by the health authorities, and unless growers are able to make it a permanent arrangement, manure is not easy to obtain. Normally the stables bed their horses on hay, shavings or even sawdust, and allow local natives or Indians to take the manure free of charge for sale to gardeners. It will be seen therefore that the mushroom grower, unless he can afford to supply straw and remove the manure regularly, merely upsets the stable routine, and is not exactly welcomed by the stables. The small grower is thus obliged to obtain supplies from the larger grower who has been able to conclude a permanent arrangement with the stables, and is in a position to sell any surplus he may have. Manure thus acquired costs roughly £3 per ton delivered.

The usual quantities of gypsum and DDT or BHC are mixed together and added to the heap at the 1st or 2nd turning, and we find three weekly turnings usually sufficient.

Shelf beds are used, and mostly imported dry spawn. Wet grain spawn, locally manufactured, has also been tried, but the former is preferred, the mushrooms being larger and, in our opinion finer.

Our shed, with its numerous ventilators, difficult to close tightly, does not peak heat very well, and in the summer months we have Mites, Springtail and Fungus Gnats to contend with, not to mention *Mycogone*, *Verticillium* and *Dactylium*. The former we combat very successfully (except perhaps Mites) with DDT powder and solution. The latter we cannot do much about except to keep the house as cool as possible, and the beds as dry as we dare, removing all mushrooms affected. By this method we have at least been able to keep the disease at bay, and have not suffered any great damage.

Casing with a rather heavy dark coarse soil, well limed and rather ineffectively sterilised with formaldehyde, is done after two to three weeks, and cropping lasts three to four months depending on the temperature.

We have not been able to better 1½ lb., indeed our average is about 1 lb., but while mushrooms sell readily at 4/- wholesale and 5/- retail this poundage pays quite well. Mushrooms for retail are packed in 1 lb. cartons soon to cost £15 per 1,000 which is certainly a high figure.

We are seriously thinking of changing to trays, with the advantages of steam sterilising, a larger growing area, and a smoother rotation of crops.

In conclusion may we express our warm appreciation of the wonderfully helpful Bulletin, and those unselfish enthusiasts who made its publication possible. Congratulations and very best wishes to all concerned.

SMALL ADVERTISEMENTS (3d. a word)

PINK GYPSUM POWDER, any quantity supplied. THOS. COX & SONS, Whiteladies Gate, Bristol.

FOR NORTHERN MUSHROOM GROWERS. Save on carriage: Finest quality imported Sphagnum Peat: 20 bushel bales. Quotations and samples on request. ELTONMOSS LTD., 8a James Street, Harrogate. 'Phone: 4554.

SMALL MUSHROOM FARM: modernised Country Residence. Flat suitable for staff. Fifteen miles Gloucester. Only £3,850 for quick sale. (Box No. 1.)

(Continued on back cover)



The attractive mushroom waxed containers illustrated on page 405 of the December Bulletin, are made by Satona Ltd., Wakefield Road, Leeds 10, from whom prices can be obtained

Why not have your Bulletins Bound ?

The twelve monthly issues of the MGA Bulletin can be bound each year into a good green cloth case, lettered in gilt with an index at the front. The cost is 12/- per volume.

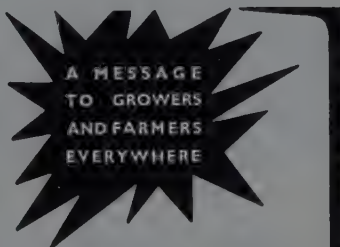
This is well worth doing because it retains your Bulletins in a neat and permanent form which facilitates easy reference. You thus have a great deal of technical information readily available.

The printers of the Bulletin undertake this binding on behalf of the MGA. Send your copies to them for binding.

The address is

W. S. MANEY & SON LTD.

Russell Street, Leeds 1



You can save money and obtain the maximum insurance at low cost if you insure with the Farmers Mutual—the largest organisation of its kind in the world.

Assets exceed £10,000,000

FARMERS MUTUAL

**NATIONAL FARMERS UNION
MUTUAL INSURANCE SOC. LTD.**

*Head Office : STRATFORD-ON-AVON
General Manager : G. C. D. Lindsay, F.C.I.I.*

MUSHROOM GROWERS & NURSERYMEN

ARE YOU WORRIED ABOUT FLIES ?

DO YOU WISH TO WIPE THEM OUT ?

The " Ronco " High Pressure Electric Spraying outfit has been designed to meet the needs of users who have to combat pests in sheds and glass houses. It is extremely portable and has a pressure of 30-35 lb. p.s.i. which atomises concentrates sufficiently to ensure penetration of sprayed insecticide to all parts of the shed or glass house.



- * **Multi-Purpose** A professional spraying machine for all kinds of Insecticides, Paints, etc.
- * **Light Weight** It weighs only 20 lb. and can be carried from place to place as you spray. Supplied in a neat fibre board case.
- * **Service** Carried out promptly by craftsmen at our factory.
- * **Price** £39 10s. 0d. complete.

Obtainable through Your Horticultural Apparatus Dealer

OR FROM

RONCO ENGINEERING COMPANY

81/85 EAST END ROAD, FINCHLEY, LONDON, N.2

Tel. TUDOR 9753/4

WE WISH A VERY PROSPEROUS 1955 TO ALL GROWERS



Our New Year Resolution will be to continue our researches into the manufacture and distribution of efficient Organic Activators and Manures. We assure growers of a First Class service of First Class products.

We hope that all growers will make a New Year Resolution to at least give a fair trial to

SHIRLEY ACTIVATOR

for its use may help to make 1955 a more prosperous year for them.

Prompt attention to all enquiries and orders will be given by the Sole Manufacturers :—

**BRANTOM, SHIRLEY
& CO. LTD.**

VICARAGE WHARF - BATTERSEA, S.W.11

Telephone : Battersea 1013 1014, 1015, 1016

Telegrams : Auricalf, Souphone, London

“SHIRLEY THE BEST”

Sell with confidence through



As prominent salesmen in the Newcastle market we are at the centre of the large industrial area of the North-East. We know this market intimately and our long standing association with leading growers is your guarantee of our good service and whole-hearted attention to your interests.

Telephone: Newcastle-on-Tyne 28451.

Telegrams: "Oranges, Newcastle."



G.E. Leatherland
LIMITED

FRUIT, FLOWER AND
VEGETABLE SALESMEN

20-22 ST. ANDREW'S STREET, NEWCASTLE-ON-TYNE, 1

“THE PROOF OF THE _____
_____”

HAVE YOU TRIED OUR LOWER PRICED ACTIVATORS YET?

**THEY REPRESENT TODAY THE BEST
VALUE THAT MONEY CAN BUY**

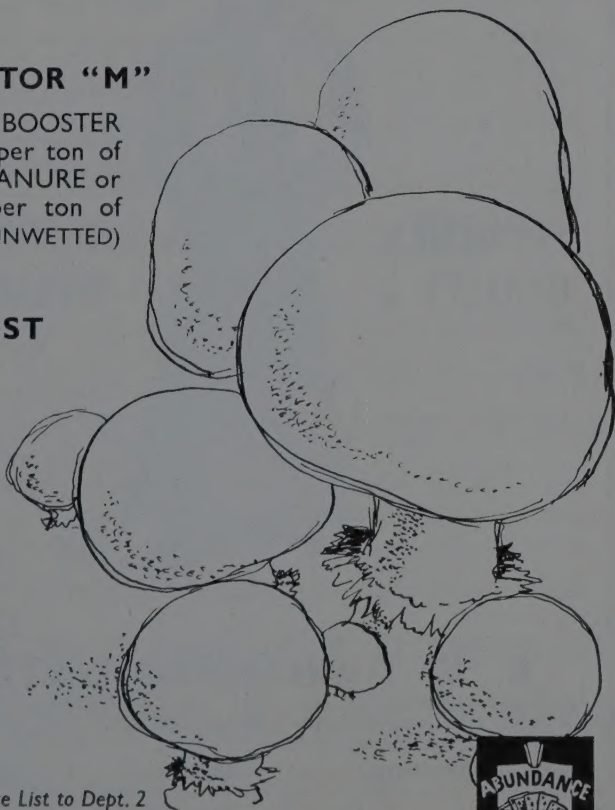
ACTIVATOR “M”

Our No. 1 BOOSTER
20/28 lbs. per ton of
STABLE MANURE or
3½ cwts. per ton of
STRAW (UNWETTED)

99·9 COMPOST MAKER

Our No. 2
BOOSTER
28/56 lbs.
per ton of
STABLE
MANURE

BOTH CON-
TAINING
TRACE
ELEMENTS

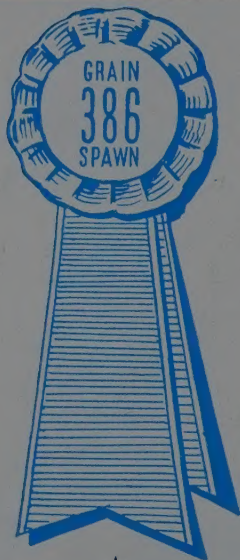


Write for Price List to Dept. 2

BRADFORD FERTILIZER Co. Ltd.
GIRLINGTON, BRADFORD 8



THE BLUE RIBBON OF GRAIN-SPAWNS



**SUPREME
QUALITY !**

**A TRUE
WINNER !**



R. C. DARLINGTON LTD.

" WILLOW LABORATORIES "

HASTINGWOOD

HARLOW

ESSEX

'Phone Potter Street 138

SMALL ADVERTISEMENTS—(continued from page 467)

PURE DRIED GROUND POULTRY MANURE. This pure, natural organic is regularly used by prominent mushroom growing firms. It represents an invaluable *organic* activator for stable manure. Finely and evenly ground, it is convenient and clean to handle and being packed in $\frac{1}{2}$ cwt. sacks, the weight you receive is *guaranteed*. Sample and prices (which vary according to the distance for carriage from our Works) on application. Sole Producers:—THE HAMPSHIRE GUANO CO. LTD., SOBERTON, SOUTHAMPTON. (Estd. 1937). Manufacturers of "Gunos" (Regd.) Brand Fertilisers.

STABLE MANURE. We can offer regular supplies from depôt in Leicestershire, also our other usual various sources, for delivery direct by Road or Rail, on certified Board of Trade Weighbridge Weight Tickets only. R. G. WARWICK, Wickham, Hants. ('Phone 3150).

CARBONATE OF LIME. Finely ground, best quality Derbyshire limestone. Supplied in 56 lb. bags for easy handling. 1 cwt., 7/-d. per cwt.; 5 cwt., 6/6d. per cwt.; 10 cwt., 6/- per cwt. Plus carriage at cost. Special prices quoted for 1 ton upwards. DERBYSHIRE STONE LIMITED, Matlock. ('Phone 741).

R. C. DARLINGTON'S "386" FREE ADVISORY SERVICE. All enquiries, 'Phone Littlehampton 1217.

MUSHROOM FARM, WORTHING area, 12,000 sq. ft. shelf-beds, well equipped, steam and H.W. Boilers, with modern 3-bedroom Bungalow, going concern. Box 16.

CHALK RUBBLE topped by Ungraded Clinker (both from Coopers, Limeburners, Canterbury) makes firm but well-drained farm roads.

J. E. R. SIMONS LTD. OFFER:—

TRIGGER LANCES. To fit $\frac{1}{2}$ " and $\frac{3}{4}$ " Hose. Complete with Oval Rose, 37/6d. plus postage.

PEAT. We can supply several types and grades. Send us your enquiry for best carriage paid prices.

SOIL STERILIZING COMPOST MERCURY THERMOMETER. Improved design, in stout brass case, registering 30/240° F. Fitted 2" Red Plastic Ball for easy location in heap. 17" 27/6d. 3 ft. 48/9d.

BARROWS, TRUCKS, ROLLER CONVEYORS.

CHIP BASKETS, PACKAGES AND ALL PAPERS. At competitive prices.

RUBBER BANDS. 1 cwt. 7/9d. lb., 56 lb. 8/-, 6 lb. and under 8/5d. lb. No. 18, 2,300 to lb., No. 32, 1,175 to lb.

PLASTIC HOSE. $\frac{1}{2}$ " 5 $\frac{1}{2}$ d. ft., $\frac{3}{8}$ " 8 $\frac{1}{4}$ d. ft., $\frac{3}{4}$ " 9 $\frac{1}{2}$ d. ft., 1" 1/3 $\frac{1}{4}$ d. ft. 60 ft. lengths and multiples.

TRAYS. New in all designs from 4/- wired ends. Used fish trays from 1/11d. Quotations by road or rail. J. E. R. SIMONS LIMITED, HARLOW, ESSEX. 'Phone: Potter Street 65. Telegrams: Simons, Harlow.

D.V.M. (15) POWDER. (ZINC ETHYLENE BIS-DITHIOCARBAMATE) THE ORIGINAL MATERIAL AVAILABLE FROM STOCK. 7-lb. Bags 4/6d. per lb.; 14-lb. 4/3 per lb; 28-lb. bags 4/- lb. ; carriage and packing free.

GYPSUM direct from Gypsum Mines 1 cwt. 6/6d., 5 cwt. 6/- cwt., 10 cwt. 5/6d. cwt., 1 to 5 tons £4 a ton, 6 tons £3 15s. 0d. ton. Carriage extra by road or rail at cost.

USED COMPOST: Kraft Paper Sacks, printed with your own name and trade mark. Quotations for large or small quantities.

SMOKE BOMBS, BHC DUSTS, DDT DUSTS. All best known brands Insecticides and Fungicides available. J. E. R. SIMONS LIMITED, HARLOW, ESSEX. 'Phone: Potter Street 65. Telegrams: Simons, Harlow.

Stable

Manure



Exclusive
Supplies
of



FRESH, CLEAN, STRAW
STABLE MANURE

Stable Manures Ltd.

NORTH ROAD
LANCING
SUSSEX
TEL. LANCING 2002

DEANS YARD
GRANBY STREET
NEWMARKET
SUFFOLK
TEL. NEWMARKET 2132

Published by the Mushroom Growers' Association, 45 Bedford Square, London, W.C.1
and printed by W. S. Maney & Son Ltd., Russell Street, Leeds 1